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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,093	04/12/2001	Paul M. Crivelli	10006533-1	2770

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HEWLETT-PACKARD COMPANY
Intellectual property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER
HUFFMAN, JULIAN D

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 09/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/834,093	CRIVELLI ET AL.	
	Examiner	Art Unit	
	Julian D. Huffman	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 June 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga et al. in view of Kawanabe et al. and Winzer et al.

Ishinaga et al. discloses a printing system receiving input data for printing images on print media comprising:

an inkjet printhead having a body (fig. 17, element 110) and a large array of ink ejection devices (fig. 1a, region 3) located on a monolithic substrate (fig. 1a/fig. 17 element 102);

a temperature sensor (fig. 31, elements S1 and S2) that senses the temperature of the inkjet printhead;

a nozzle member coupled to the substrate (fig. 17, element 103);

a controller (fig. 3, element 11) that uses the sensed temperature to control temperature variations of the printhead to be within a predefined range from a starting point of a print swath to an end point of the print swath and successive print swaths of ink (column 25, lines 45-47);

wherein the controller is one of an integrated circuit processor, a printer driver or firmware (column 26, lines 54-59) and further wherein the controller controls an

increase in the mean temperature of the substrate through a feedback loop that turns on and off heating elements (H1, H2, column 25, lines 1-15) to control the temperature of the substrate, wherein the controller initiates heating elements associated with the ink ejection elements if the temperature data is below a printing threshold and turns off the heating elements when the threshold temperature of the substrate has been reached;

further comprising a programmable feedback loop that activates heating elements associated with the ink ejection elements and increases the baseline temperature of the substrate before printing and decreases the temperature differential between the baseline temperature and the mean temperature of the substrate (fig. 39, column 28, line 57-column 29, line 68); and

wherein the controller controls temperatures of specific sections of the substrate and a baseline temperature of ink ejection nozzles of the nozzle member associated with the respective sections (column 25, lines 1-15); and

wherein the controller receives temperature data from a digital temperature sensor (column 24, lines 43-47 and column 8, lines 59-61).

Ishinaga et al. do not expressly disclose the use of pigment ink, or optimizing the temperature operating range based on the input data.

However, Kawanabe et al. discloses printing with pigment ink (column 85, lines 35-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute pigmented ink in the invention of Ishinaga et al. as modified. The reason for performing the modification would have been to maintain

superior contrast over dye ink, between a black printed region and a differently-colored region such as white paper.

Ishinaga et al. in view of Kawanabe et al. do not expressly disclose providing the temperature control means on the printhead.

However, Winzer et al. suggest providing a control means (fig. 1, element 28) in close proximity to the device it controls (column 5, lines 53-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Winzer et al. into the invention of Ishinaga et al. in view of Kawanabe et al. thereby obtaining the invention claimed for the purpose of reducing the signal to noise ratio.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga et al. in view of Kawanabe et al. and Winzer et al. as applied to claim 8 above, and further in view of Kato et al. (U.S. 6,135,656).

Ishinaga et al. in view of Kawanabe et al. and Winzer et al. do not expressly disclose heating black pigment ink to 40 degrees Celsius and color pigmented ink to 45 degrees Celsius.

However, Kato et al. discloses that ink should be temperature adjusted in a range of 30-70 degrees Celsius (column 18, lines 22-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Kato et al. into the invention of Ishinaga et al. in view of Kawanabe et al. and Winzer et al. to obtain the invention

claimed for the purpose of maintaining the viscosity of the ink at a value that provides reliable ejection of ink.

4. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga et al. in view of Kawanabe et al.

Ishinaga et al. discloses a method for printing images with an inkjet printhead on a print media from a printing system having heating elements located on a substrate, the method comprising:

receiving a temperature of the substrate before printing begins (column 28, lines 57-column 29, line 1) comparing the temperature with a set point for printing (column 29, lines 48-53);

initiating the heating elements if the temperature is below a predetermined printing threshold (column 29, line 58-column 30, line 5);

turning off the heating elements when the threshold temperature of the substrate has been reached (column 30, lines 1-5); and

controlling temperature variations of the printhead to be within a predefined range from a starting point of a print swath to an end point of the print swath and successive print swaths of pigmented ink (column 25, lines 45-47);

minimizing air bubble growth rates and bubble size within the printhead to enable expulsion of the air bubbles from the printhead without clogging (inherent);

maintaining a mean temperature of the substrate at a temperature that is within a predefined range of an optimal temperature for the production of a droplet of ink (column 28, lines 10-13); and

controlling temperatures of specific sections of the substrate and a baseline temperature of ink ejection nozzles associated with the respective sections (column 25, lines 1-15).

Ishinaga et al. does not expressly disclose the use of pigment ink.

However, Kawanabe et al. discloses printing with pigment ink (column 85, lines 34-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute pigmented ink in the invention of Ishinaga et al. The reason for performing the modification would have been to maintain superior contrast over dye ink, between a black printed region and a differently-colored region such as white paper.

5. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga et al. in view of applicant's admitted prior art and Kawanabe et al.

Ishinaga et al. discloses a method for printing images with an inkjet printhead on a print media from a printing system having heating elements located on a substrate, the method comprising:

receiving a temperature of the substrate before printing begins (column 28, line 57-column 29, line 1) comparing the temperature with a set point for printing (column 29, lines 48-53);

initiating the heating elements if the temperature is below a predetermined printing threshold (column 29, line 58-column 30, line 5);

turning off the heating elements when the threshold temperature of the substrate has been reached (column 30, lines 1-5); and

controlling temperature variations of the printhead to be within a predefined range from a starting point of a print swath to an end point of the print swath and successive print swaths of pigmented ink (column 25, lines 45-47);

maintaining a mean temperature of the substrate at a temperature that is within a predefined range of an optimal temperature for the production of a droplet of ink (column 28, lines 10-13); and

controlling temperatures of specific sections of the substrate and a baseline temperature of ink ejection nozzles associated with the respective sections (column 25, lines 1-15).

Ishinaga et al. does not specifically state that the temperature control minimizes air bubble growth rates and bubble size within the printhead to enable expulsion of air bubbles from the printhead without clogging.

However, Ishinaga et al. disclose comparing temperature to a predetermined reference value and controlling the heaters so that the temperature is maintained at the reference value.

Further, applicant's admitted prior art discloses:

If the temperature of the ink reaches a sufficiently high temperature the solution itself may reach its boiling point and also form a gas. The bubbles choke the nozzles and cause deterioration in the quality of the image on the print media. Temperature also controls the uniformity of the drop size of the ejected ink. There is an optimal

temperature operating range for printheads using inks, in particular pigmented inks. If the temperature is too low the ink droplets formed will be smaller and have a lower drop-weight than that required for good image quality. As the temperature rises, the drop-weight of the ink droplet will rise. The variation in drop weight varies with the ink being used. These variations in drop-weight will cause visible hue shifts in the printed image (page 2, line 22 to page 3, line 6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to select a reference value in the invention of Ishinaga et al. to minimize air bubble growth rates and bubble size within the printhead and to enable expulsion of air bubbles from the printhead without clogging. The reason for selecting the appropriate reference value would have been to enable good image quality, prevent visible hue shifts in the printed image, and prevent choking of the nozzles and deterioration of the quality of the image on the print media.

Ishinaga et al. as modified does not expressly disclose the use of pigment ink.

However, Kawanabe et al. discloses printing with pigment ink (column 85, lines 34-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute pigmented ink in the invention of Ishinaga et al. as modified. The reason for performing the modification would have been to maintain superior contrast over dye ink, between a black printed region and a differently-colored region such as white paper.

Response to Arguments

6. The applicant argues that Ishinaga et al. does not disclose controlling temperature variations from a starting point of a print swath to an end point of the print swath.

The examiner respectfully disagrees. Ishinaga et al. discloses two temperature control operations. One which is performed when the printhead is not printing and one which is performed during printing. Fig. 40 shows the improvement provided by combining both preheating and temperature control during printing and column 25, lines 45-47 states that the recording operation is performed while controlling the temperature of the substrate.

Applicant argues that Ishinaga et al. does not disclose minimizing air bubble growth rates and bubble sizes within the printhead to enable expulsion of the air bubbles from the printhead without clogging.

This argument is not found persuasive since a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Ishinaga et al. discloses comparing head temperature to a reference temperature and heating the heaters to increase the head temperature, or reducing the heater signal to reduce the head temperature accordingly.

Further, applicant discloses in the background of the invention that temperature effects bubble growth rates and the formation of air bubbles and since Ishinaga et al. controls temperature of the head, Ishinaga et al. inherently controls bubble growth rates and formation of air bubbles.

Further, in the method claims, the prior art performs the same steps as applicant and the result of performing the steps is necessarily a minimization of air bubble growth rates and bubble sizes which enable expulsion of the air bubbles from the printhead without clogging.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (703)

308-6556. The examiner can normally be reached on Monday through Friday from 9:30 a.m. to 6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow, can be reached at (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722. Faxes requiring the immediate attention of the examiner may be sent directly to the examiner at (703) 746-4386. Note that this number will not automatically send a confirmation that the fax was received.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JH

JH

September 6, 2002

John Barlow
Supervisory Patent Examiner
Technology Center 2800